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Q65895

PCT/NL00/00181

September 19, 2001

BOX PCT

Commissioner for Patents
Washington, D.C. 20231PCT/NL00/00181
-filed March 17, 2000

Re: Application of Ronald G. A. STOELTIE
 USE OF INSULIN IN MEAT PRODUCTS
 Assignee: UNIFINE INDUSTRY B.V.
 Our Ref: Q65895

Dear Sir:

The following fees are submitted herewith in connection with the above application for the purpose of entering the National stage under 35 U.S.C. § 371 and in accordance with Chapter II of the Patent Cooperation Treaty.

The Declaration and Power of Attorney and Assignment will be submitted at a later date.

It is assumed that copies of the International Application, the International Search Report, the International Preliminary Examination Report, and any Articles 19 and 34 amendments as required by § 371(c) will be supplied directly by the International Bureau, but if further copies are needed, the undersigned can easily provide them upon request.

Applicant claims benefit of small entity status in accordance with 37 CFR § 1.27.

The Government filing fee is calculated as follows (**Small Entity fees apply**):

Total claims	15	-	20	=	<u> </u>	x	\$9.00	=	<u> </u>	\$0.00	
Independent claims	4	-	3	=	<u> </u>	x	\$40.00	=	<u> </u>	\$40.00	
Base Fee										<u> </u>	\$430.00
Multiple Dependent Claim Fee										<u> </u>	\$135.00
TOTAL FEE										<u> </u>	\$605.00

A check for the statutory filing fee of \$605.00 is attached. You are also directed and authorized to charge or credit any difference or overpayment to Deposit Account No. 19-4880. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.492 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Priority is claimed from March 19, 1999 based on Netherlands Application No. 1011618.

Respectfully submitted,

Robert J. Seas, Jr.
Robert J. Seas, Jr.
Registration No. 21,092

RJS:rwl

Use of inulin in meat products

The invention relates to the use of inulin in meat products based on both high-grade and low-grade meat and in particular on poultry meat.

When preparing meat products in dry form on the basis of, for example, low-grade starting material, meat, mechanically deboned meat (MDM), soya and rind are the most important sources of protein. In this context a number of problems arise in practice, such as:

- an end product which is too dry and not homogeneous;
- deviations in taste as a result of inferior raw materials (soya and MDM); and
- problems during processing because the temperature of this type of product rises very rapidly during production.

When preparing high-grade meat products, in particular from poultry meat (chicken, etc.) the water binding of the end product is frequently problematical. The cutability and frying characteristics of the product also frequently leave something to be desired.

Auxiliaries, such as sugars, flavourings and in particular phosphate adjuvants are added to solve such problems. The role of such phosphate adjuvants is to retain the water in the meat product so that the meat product can be regarded as a tender product. However, such auxiliaries have disadvantages, such as doubts with regard to the health aspects, a rise in the calorific value and an inadequate effect as far as processibility, hardness and organoleptic properties are concerned, as a result of which acceptance by the general public is limited.

Surprisingly, it has now been found that the problems in the preparation of meat products as described above can be overcome by using inulin to replace conventional auxiliaries, in particular phosphate adjuvants, in meat products. More particularly, the invention relates to the use of inulin in a quantity of 0.5 - 8 % (m/m), based on the total weight of the meat product in phosphate adjuvant-free meat products, which contain at least 10 - 95 % (m/m) meat and 3 - 60 % (m/m) water.

According to the invention, inulin (fructan with a terminal glucose group) is added in a quantity of preferably 2 - 7 % (m/m), in particular 2.5 - 4 % (m/m), based on the total weight of the end product. In this context the inulin can also completely or partially replace conventional additives such as starch or maltodextrins and sugars. Inulin has also been found to impart taste-improving characteristics to fried meat, as a result of which the use of flavourings such as hydrolysed vegetable proteins and stock can be restricted or can be dispensed with. The preferred use of inulin according to the invention is described in more detail in the appended dependent claims.

The use of inulin in meat products is known per se. However, inulin is used here as a fat replacement, which is not the purpose in the present invention.

More particularly, the use of a "high performance" inulin product which has a substantially raised average degree of polymerisation (DP) in foods compared with the natural product is described in WO 96/01849 A. An inulin product which has an average DP of between 20 and 40, in particular between 23 and 27, and a maximum DP of between 60 and 70 is described on page 13, line 15 et seq. of this literature citation. It can be seen from a specific field of application mentioned on page 32, line 25 et seq. that this "high performance" inulin product is used to replace fat and/or oil in food products. The "Frankfurter sausages" with a substantially reduced fat content which are described in Examples 22 and 23 of said WO 96/01849 A also contain a phosphate product in addition to the inulin product. Furthermore, Example 24 of this literature citation describes an offal product, that is to say a spreadable liver pâté, with a reduced fat content of 13 % (m/m), which provides a fat reduction of 60 % compared with the standard recipe, whilst in Example 15 33 a "lean beef" hamburger with an exceptionally high inulin cream content of 30 % is described to make it possible to achieve appreciable meat replacement or a "mouth-feel" which can be produced by "fat products".

WO 94/22327 describes a stabilised food product with a reduced solids content, in which, for example, inulin in an amount of 1 - 15 % (m/m) is present as stabiliser. The use of inulin as a fat substitute is also mentioned in this literature citation (see page 1, line 29 et seq.). In Example 2 of said WO 94/22327 a reduction of approximately 20 % in fat-containing meat is achieved by use of inulin or water, with retention of the desired sausage characteristics.

Furthermore, US Patent 5 527 556 relates to the use of inulin creams in water as a fat replacement in foods, as can be seen from the description and, in principle, all use examples. In the only example in which a meat product is described, i.e. Example 19, the fat content of liver pâté is appreciably reduced by the use of 15 % of such an inulin cream.

The advantages of the use of inulin according to the invention also lie in the production process, inter alia in the case of meat products based on low-grade starting material. The free water (ice) that is added during the production process is rapidly taken up by the inulin. Consequently the throughput time of other raw materials is promoted, with the consequence that as a result of more substantial comminution more protein activation takes place at a lower temperature. Consequently, fat and water can be better bound to the protein molecules

released. As a result of the longer throughput time of the dough an end product is obtained which has a better cut face. Furthermore – after frying – the product has a better feel in the mouth and a better taste than a corresponding meat product containing phosphate adjuvant.

When used in raw muscle meat products injected with inulin, preferably poultry meat products (chicken, turkey, etc.), there is the advantage that the inulin is also able completely or partially to replace other substances such as starch and gums as well as the phosphate auxiliary. Although the injection of an inulin solution is preferred for this application, other methods for incorporating the inulin in the poultry meat, such as mixing in a drum, can also be considered. Furthermore, it can be useful to allow the product to rest for some time, for example 6 - 12 hours, following incorporation, so that the inulin has the opportunity to gel. As a result of the inulin, the poultry meat product also has a better taste and a better colour during or after frying than a poultry meat product containing a phosphate adjuvant.

The inulin to be used can be a commercial form of inulin. Specifically, the inulin can originate from chicory, dahlias, Jerusalem artichokes, etc. An inulin with a chain length of 3 to 60 sugar units, preferably with an average chain length of 8 to 30 fructose units (DP = 8 - 30), in particular of 8 to 20 fructose units (DP = 8 - 20), can be used. Advantageously, short chains (5 or less fructose units) make up less than 25 % (by weight) of the total inulin. The chain length can be that of the natural product, or can advantageously have been modified by hydrolysis, enzymatic chain lengthening or separation techniques such as crystallisation or chromatography.

The other constituents of the products in which inulin is used according to the invention can be conventional constituents. In the case of low-grade meat these constituents can be 10 - 40 % (m/m) meat (on protein basis), 2 - 15 % (m/m) protein (other than meat), 3 - 15 % (m/m) fat, 30 - 60 % (m/m) water, 0 - 3 % (m/m) other carbohydrates, 0 - 4 % (m/m), preferably 0.2 - 4 % (m/m), flavourings (herbs, onion powder, garlic powder, onion) and 0 - 2 % (m/m), preferably 0.2 - 2 % (m/m), salts. In particular such a product contains 15 - 33 % (m/m) emulsified rind, 7 - 20 % (m/m) emulsified fat, 11 - 25 % (m/m) MDM and 3 - 12 % (m/m) soya protein as main constituents.

In the case of poultry meat the constituents can be, for example, 70 - 95 % (m/m) meat, 5 - 25 % (m/m) water, 0 - 3 % (m/m) other carbohydrates, 0 - 2 % (m/m), preferably 0.1 - 2 % (m/m), flavourings and 0 - 2 % (m/m), preferably 0.2 - 2 % (m/m) salts. In this context the inulin, optionally together with other water-soluble additives, is preferably injected as a solution, in an amount by weight of 5/95 to 30/70 (solution/meat), preferably 8/92 to 20/80

and most preferentially 10/90 to 17/83.

EXAMPLES

Example 1

5 A meat product according to the invention based on MDM and having the composition (A) according to the following table was prepared. For comparison such a product according to the prior art, having the composition (B), was prepared. After frying, product (A) achieved significantly better ratings than product (B) both in terms of taste (determined by a taste panel of five trained tasters) and in terms of cutability. (The percentages are expressed in % (m/m).)

10

		(A) According to the invention	(B) Comparison
	emulsified rind (1)	23.6	23.6
	emulsified fat (2)	12.9	12.9
15	MDM	17.5	17.5
	ice	31.2	31.2
	isolated soya (90 % protein)	7.0	7.0
	maxten E100 (50 % protein)	1.7	1.7
	herbs	0.6	0.6
20	onion powder	0.25	0.25
	garlic powder	0.25	0.25
	chopped onion (1 - 3 mm)	0.3	0.3
	salt	1.2	1.2
	starch	-	2.3
25	HVP	-	0.5
	phosphate	-	0.3
	dextrose	-	0.35
	inulin (average chain length (DP) is 10)	3.5	-
30		100	100

(1): 50 % rind, 50 % water

(2): 44 % pig fat, 11 % soya fat, 1 % salt and 44 % ice water

Example 2

A solution having the following composition:

	water	8.4 %
5	salt	0.7 %
	RFCK (stock)	0.3 %
	maltodextrin	0.5 %
	dextrose	0.1 %
	inulin (average chain length (DP) is 10)	3.0 %
10		_____
		13.0 %

was injected into raw chicken (87.0 %) (using approximately 15 % (m/m) based on the chicken). (The percentages are expressed % (m/m).)

15 In the assessment of a taste panel the characteristics of the product were clearly better than those of the same product without inulin as far as frying behaviour and taste were concerned.

Example 3

20 Comparative tests relating to inulin in place of phosphate adjuvant in salting applications for poultry meat.

The tests were carried out with brine compositions 1 to 4 on the basis of injection at 15 % on the raw chicken. The batch size per test was 50 kg. (The percentages are expressed in %

25 (m/m).)

Brine composition 1:	water	8.5 %
	salt	0.7 %
	maltodextrin	0.7 %
30	dextrose	0.1 %
	inulin (average chain length (DP) is 10)	3.0 %

	Total	13.0 %

Brine composition 2:	water	8.5 %
	salt	0.7 %
	maltodextrin	0.7 %
5	dextrose	0.1 %
	inulin (average chain length (DP) is 20)	3.0 %

	Total	13.0 %

10

Brine composition 3:	water	8.5 %
	salt	0.7 %
	maltodextrin	0.7 %
	dextrose	0.1 %
15	inulin (average chain length (DP) is 15 - 20)	3.0 %

	Total	13.0 %

20

Brine composition 4:	water	8.5 %
	salt	0.7 %
	sugars	0.7 %
	sodium tripolyphosphate	3.0 %
	alginate	0.1 %
25		_____
	Total	13.0 %

Test method

- Injection at 15 % on the raw meat weight.
- 30 • Multi-needle injector
- Tumbling : 10 minutes running/15 minutes rest/10 minutes running/15 minutes rest/ 10 minutes running (without vacuum)
- Total residence time including tumbling: 3 hours.

Result in raw state after injection and tumbling

- There are no visually detectable differences after 3 hours.
- No differences in weight of the four compositions are detectable. ≈ 57.6 kg.

5

Result after heating to an internal temperature of 78 °C and cooling to 2 °C**Test 1**

Weight after heating: 51.23 kg

10

Test 2

Weight after heating: 52.7 kg

Test 3

15 Weight after heating: 52.81 kg

Test 4

Weight after heating: 52.7 kg

20 The organoleptic properties (taste/colour, texture, odour) determined by an assessment panel are significantly better for the product obtained according to the invention (Tests 1, 2 and 3) than for the reference product containing the phosphate adjuvant according to the prior art (Test 4).

Claims

1. Use of inulin in phosphate adjuvant-free meat products, which contain at least 10 - 95 % (m/m) meat and 3 - 60 % (m/m) water, in an amount of 0.5 - 8 % (m/m) based on the total weight of the meat product.
2. Use according to Claim 1, wherein the meat product is a product based on low-grade meat that contains at least 10 - 40 % (m/m) meat, 30 - 60 % (m/m) water, 0 - 4 % (m/m) flavourings and 0 - 2 % (m/m) salts, based on the total weight of the meat product.
3. Use according to Claim 1 or 2, wherein the meat product also contains 2 - 15 % (m/m) protein other than meat and 3 - 15 % (m/m) fat, based on the total weight of the meat product.
4. Use according to Claim 1, wherein the meat product contains chicken or turkey whole muscle meat as meat.
5. Use according to Claim 4, wherein the meat product is a poultry meat product that contains 70 - 95 % (m/m) meat, 3 - 25 % (m/m) water, 0 - 2 % (m/m) flavourings and 0 - 2 % (m/m) salts, based on the total weight of the meat product.
6. Use according to Claim 5, wherein the inulin is injected into the poultry meat in the form of a solution in water, in particular 8 - 20 parts inulin solution in 80 - 92 parts meat.
7. Use according to one or more of Claims 1 - 6, wherein 2 - 7 % (m/m), in particular 2.5 - 4 % (m/m), inulin is used in the meat product, based on the end weight of the meat product.
8. Use according to one or more of Claims 1 - 7, wherein the inulin has an average chain length of 3 to 60, in particular 8 to 30.
9. Phosphate adjuvant-free meat product which contains at least 10 - 95 % (m/m) meat, 3 - 60 % (m/m) water and 0.5 - 8 % (m/m) inulin, based on the total weight of the meat

product.

10. Phosphate adjuvant-free meat product that contains 10 - 40 % (m/m) meat, 30 - 60 % (m/m) water, 0 - 4 % (m/m) flavourings, 0 - 2 % (m/m) salts and 2 - 5 % (m/m) inulin.

5

11. Meat product according to Claim 10 that contains 15 - 33 % (m/m) emulsified rind, 7 - 20 % (m/m) emulsified fat, 11 - 25 % (m/m) MDM and 3 - 12 % (m/m) soya protein.

12. Phosphate adjuvant-free meat product that contains 70 - 95 % (m/m) meat, in
10 particular poultry meat, 3 - 25 % (m/m) water, 0 - 2 % (m/m) flavourings, 0 - 2 % (m/m) salts
and 2 - 5 % (m/m) inulin.

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COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL DESIGN, NATIONAL STAGE OF PCT OR CIP APPLICATION)

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Use of inulin in meat products

the specification of which: (complete (a), (b) or (c) for type of application)

REGULAR OR DESIGN APPLICATION

a. [] is attached hereto.
b. [] was filed on _____ as Application
Serial No. _____ and was amended on _____
(if applicable)

PCT FILED APPLICATION ENTERING NATIONAL STAGE

c. X] was described and claimed in International application No. PCT/NL00/00181
filed on 17 March 2000
and as amended on _____ (if any)

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, paragraph 1.56(a).

In compliance with this duty there is attached an information
disclosure statement 37 CFR 1.97

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code paragraph 119 of any foreign application (s) for patent of inventor's certificate listed below and have also identified below any foreign application for patent of inventor's certificate having a filing date before that of the application on which priority is claimed.

d. [] no such applications have been filed
 e. [X] such applications have been filed as follows

**EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS
 (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION**

Country	Application Number	Date of filing (day, month, year)	Date of Issue (day, month, year)	Priority claimed
the Netherlands	1011618	19 March 1999		Yes

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
 (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION**

CONTINUATION-IN-PART

(Complete this part only if this is a continuation-in-part application)

20 I hereby declare claim the benefit under Title 35, United States code, paragraph 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claim of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, paragraph 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, paragraph 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (Filing date) (Status) (patented, pending, abandoned)

(Application Serial No.) (Filing date) (Status) (patented, pending, abandoned)

POWER OF ATTORNEY

19 I hereby appoint John H. Mion, Reg. No. 18,879, Donald E. Zinn, Reg. No. 19,046, Thomas J. Macpeak, Reg. No. 19,292, Robert J. Seas, Jr., Reg. No. 21,092, Darryl Mexic, Reg. No. 23,063, Robert V. Sloan, Reg. No. 22,775, Peter D. Olexy, Reg. No. 24,513, J. Frank Osha, Reg. No. 24,625, Waddell A. Biggart, Reg. No. 24,861, Robert G. McMorrow, Reg. No. 19,093, Louis Gubinsky, Reg. No. 24,835, Neil B. Siegel, Reg. No. 25,200, David J. Cushing, Reg. No. 28,703, John R. Inge, Reg. No. 26,916, Joseph J. Ruch, Jr., Reg. No. 26,577, Sheldon I. Landsman, Reg. No. 25,430, Richard C. Turner, Reg. No. 29,710, Howard L. Bernstein, Reg. No. 25,665, and Alan J. Kasper, Reg. No. 25,426, my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and request that all correspondence about the application be addressed to SUGHRUE, MION, ZINN, MACPEAK & SEAS, 2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037-3202

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00
Full name of sole or first inventor: STOELTIE, Ronald Gerardus Antonius

Inventor's signature



Date 18 October 2001 Country of Citizenship: the Netherlands

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